

- \* FUSION POWER SETBACK
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## Washington SCIENCE TRENDS

HERMONUCLEAR POWER PROBLEMS, first reported publicly by the Russians at Geneva, are now officially admitted by the Atomic Energy Commission. Discovery of radiation "leakage" in fusion test apparatus is causing a reshuffling of target dates and programs. The newly apparent pessimism on fusion prospects indicates a longer "breathing spell" for the development of economically competitive nuclear power.

Containment of a thermonuclear reaction by stronger magnetic fields may still be possible. However, AEC is showing interest in alternative methods. Radio engineers are being urged to find a means of using new microwave techniques to set up containing fields around the super-heated gas that serves as the fusion fuel.

Best hope for achievement of an experimental fusion reaction appears to lie with the Stellarator now under construction at Princeton. But it will be 1960 before this equipment is completely installed and no one expects that it will ever produce more power than it consumes. Meanwhile, private industry can assure its nuclear reactor customers that controlled thermonuclear power on a commercial scale is decades away.

INCREASED ACTIVITY on the nuclear reactor front is evident and will continue in the coming months. AEC will strengthen its Division of Reactor Development. The well-publicized attempt by General Electric to encourage mass installation of small power units is another move, that may win some utility support. Behind these developments is the determination of the Joint Committee on Atomic Energy to step up development and production.

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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION is confident it will eventually win its battle with the Army over control of space projects and scientists at the Redstone Arsenal. NASA teams have also expressed keen interest in all or part of two other installations -- The Army Signal Corps facilities at Ft. Monmouth, New Jersey and the Naval Ordnance Test Station at China Lake, Calif. Discussions have also been taking place with top officials of the AEC regarding nuclear rocket programs and nuclear auxiliary power projects for satellite and spaceflight applications.

**MISSILE NOTEBOOK:** Next space probe attempt, using Air Force Pioneer, due Friday, Nov. 7.....Army attempt to orbit the moon slated for second week of December.....Russians report they have "almost" solved the problem of controllable satellites by successfully stabilizing a high-altitude rocket in an unpublicized test late in August.

HYDROFOIL CRAFT may be the next major step forward in Navy Research and development programming. Officials believe that a ship as large as 150 tons can be built and operated successfully with available knowledge and existing equipment. The hydrofoil, Rear Adm. Denys W. Knoll points out, can cut power requirements by one half for smooth water operation and can perform reliably in rough water.

Knoll foresees "staggering possibilities" in the combination of nuclear power and the hydrofoil. Chief advantages are greatly increased speed, considerable economy in power and almost unlimited endurance. The newly developed super-cavitating propellers, while not likely to be adapted for current ships, are expected to prove ideal for unconventional hulls such as the hydrofoil.

NEW SHIP IDEAS are being welcomed by the Navy these days. Bureau of Ships has set up an Advanced Studies Section. Young Naval officers and engineers are assigned to the section on a rotational basis. For one year they are isolated from all administrative duties and normal routine so that they can examine new proposals and concepts. When the year is over they are rotated to new posts and replaced with "fresh" minds.

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GEODETIC STUDY FLIGHTS using new Air Force equipment have disclosed unsuspected mapping errors. The system is an improved version of HIRAN, a high precision, short range navigation radar. Flight tests with C-130 aircraft have proved successful, and 15 additional aircraft with full instrumentation will be purchased next year.

Test flights showed that maps of Cuba place the island 1,200 feet out of position with respect to the North American continent. Surveys of the eastern coast of Florida led to the discovery of a small island six miles from its charted position.

A closed-circuit TV system guides the aircraft along parallel photographic flight lines. Camera transmits its pictures to a 7-inch scope used by the photo-navigator. Photo-mapping cameras are held in level position by gyro-stabilized mounts. A radar altimeter is used to determine terrain features, and parachute-borne radiosondes transmit corrections for humidity, temperature and pressure.

Air force says further work is now in progress to develop an airborne digital recorder which can collect all necessary data simultaneously with camera photography. Tape from the recorder can then be fed into a ground digital computer and the results obtained in minutes rather than hours.

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SCIENCE EDUCATION: National Science Foundation is working on plans to permit high school students with special abilities in science and mathematics to participate in summer work at selected colleges, universities and non-profit institutions. Officials hope to have the program in operation next year.

SPACE AGENCY CONTRACTING procedures will keep to the pattern familiar to industry; the Armed Services Procurement Act. This is good news for research, development and production firms since they will not be required to learn new regulations and procedures. National Aeronautics and Space Administration (NASA) predicts a "major procurement and contracting program" in connection with its activities in space flight and exploration.

First big step will be a meeting at Langley Field, Va., Friday, Nov. 7, at which more than a score of missile and aviation manufacturers will be briefed on design and production requirements for so-called flyable mock-ups -- devices to be used in ballistic flight tests looking toward a man in space program.

NASA will invite bid proposals, and a contract will be awarded some time after the first of the year. The successful bidder will be responsible for design, fabrication and/or procurement, integration, and installation of all components.

The winning design is expected to be generally similar in outward appearance to the capsule concepts that have been previously proposed, but it will not be a true space craft. NASA describes it as a research test vehicle in which the problems of man's ability to adapt himself to and perform in a space environment will be studied.

Here is a brief general guide to NASA contracting plans:

\* NASA will continue to purchase those types of services, materials and equipment ordinarily associated with the work at its field laboratories.

\* NASA will seek to develop and use contractual sources capable of designing, developing, producing and testing space vehicles and the supporting services and products related to the successful launching and operation of such vehicles.

\* Agency plans to advertise for competitive bids on supplies, materials and equipment whenever the requirements can be clearly defined. Contract awards on a fixed price basis will be made to the lowest responsible bidder.

\* When product or service requirements cannot be precisely defined awards generally will be made following competitive negotiation with qualified firms. Most cases of this sort will arise on research or development contracts. Awards will be either at a fixed price or at actual cost plus a fixed fee.

\* Contracts will also be negotiated by NASA with educational institutions and other non-profit organizations for the conduct of specified research and development projects.

\* Small business firms will be given the opportunity to participate in supplying NASA procurement needs "to the maximum extent practicable, consistent with accomplishment of the purposes of the National Aeronautics and Space Act of 1958."

THE CHECKLIST

( ) Photo-Mapping technique employed by U.S. Air Force combines radar and television with what is termed "phenomenal accuracy." (Write Office of Information Services, HQ. ARDC, Andrews Air Force Base, Washington 25, D.C. for Release No. 156-58)

( ) Defense Department utilization of Scientists and Engineers surveyed in newly-printed transcript of closed-door hearings. 167 pages. Free. (Write Committee on Armed Services, Old House Office Building, Washington 25, D.C. for Hearings, Subcommittee No. 6)

(The following publications are now available from Printing & Publishing Office, National Academy of Sciences, 2101 Constitution Ave., Washington 25, D.C.)

( ) Research in Maritime Transportation, papers presented at a maritime research symposium summarizing current and planned research objectives, activities and plans of the Maritime Administration and various studies of cargo handling, nuclear propulsion, ship design, etc. 140 pages; \$2. Ask for Publication No. 592.

( ) Research and Education in Meteorology, a reprint from the Bulletin of the American Meteorological Society, June 1958, outlining the activities required to enable scientists to "initiate an attack on national and world-wide atmospheric problems." 23 pages; \$1. Ask for Publication 479.

( ) Fellowship Selection Research, a progress report summarizing in non-technical fashion the results of over four years of research on problems of fellowship selection. An appendix lists brief summaries of a number of technical reports on the problem. 37 pages; \$1. Ask for Publication No. 564.

( ) Doctorate Production in U.S. Universities, covering natural sciences, social sciences, arts and humanities from 1936 - 1956. Information on all U.S. universities and 62 foreign institutions is included. 155 pages; \$2. Ask for Publication 582.

( ) Clays and Clay Minerals, the Proceedings of a national conference on the subject held at Urbana, Ill. in 1956. 360 pages; \$4.50. Ask for Publication No. 566.

( ) Concepts of Biology, a reprint of the April, 1958 issue of Behavioral Science, described as an "exciting report of a small group exploring in a broad scope the general concepts of the science." 124 pages; \$1.75. Ask for Publication 560.

( ) Improving College Biology Teaching, a conference report summarizing the proposals of 314 biologists on means of improving the general level of biology instruction. 75 pages; \$1. Ask for Publication No. 505.

